Abstract of the Invention

The present invention provides improved diffusion tips for optical fibers and methods of making the same. Nanoporous silica clad optical fibers are used to make fibers having integrally formed diffusion tips and diffusion tips that can be fused to other fibers. The disclosed diffusers can be fabricated to be cylindrical with light diffusing along its length, spherical with light radiating outwardly in a spherical pattern, or custom shaped to illuminate irregular surfaces or volumes. Gradient and step index properties can also be achieved. Several fabrication methods to achieve the desired effects are described. The problems in the prior art methods associated with epoxy, such as curing, bond strength, embrittlement, power handling limitations, and refractive index matching are avoided.